STATUS AND PLUMAGES OF THE WHITE-WINGED GULLS OF THE GENUS *LARUS*.

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Plate I.

IN NEARLY all of the many species of gulls so widely distributed in both hemispheres, the primaries are black variously patterned with white or gray, but there are several species, Arctic in their distribution, which may be set apart from the others by the whiteness or pale coloration of these feathers at all stages of plumage. The best known of these is the Glaucous Gull or Burgomaster (*Larus glaucus*), the adult of which is a large bird, snowy white except for the pale pearl-gray mantle, the color running over into the primaries and fading out to white towards their apices. This species is circumpolar, but Alaskan specimens, averaging a trifle smaller, have received a name, the Point Barrow Gull (*Larus barrovianus*). Confined chiefly to the Arctic regions lying between Spitzbergen and northern Canada is a small edition of the Burgomaster,— the Iceland or White-winged Gull (*Larus leucopterus*). Less Arctic in distribution and found breeding on the Pacific coast of North America, from the United States northward, is the medium-sized Glaucous-winged Gull (*Larus glaucescens*) which in a measure forms a connecting link between the white-primaried species just mentioned and those having black primaries with white spots. The mantle of this gull is much darker than that of *glaucus*, and the primaries are slaty with terminal white spots. Kumlien's Gull (*Larus kumlieni*) originally described from a specimen taken on Cumberland Sound, and Nelson's Gull (*Larus nelsoni*), taken in Alaska near St. Michaels, appear to be a small and a large edition of the same species, the latter being nearly the size of *glaucus*, the former about that of *leucopterus*. Unlike either of the two, however, the primaries of both *kumlieni* and *nelsoni* are more or less banded terminally or edged with slaty markings. The status of both is open to some doubt, for specimens are rare. Intergradation between them seems proba-

ble, and furthermore it is possible they may prove to be the connecting links between *glaucus* and *leucopterus* on the one hand and *glaucescens* on the other, but at present there is no evidence that they represent any stage of plumage of any of these three distinct species.

The material on which I have based my conclusions has been most extensive, including not only the series in the large collections of our own country, but I have also had opportunity for examining those in the British Museum, in the Rothschild Museum at Tring, and in the museum at Berlin. In spite of this large amount of available material, some 350 specimens in all, the great lack of proper sexing has proved a serious stumblingblock, and to overcome possible errors resulting from this cause, I have confined my measurements of adults almost wholly to birds taken in the breeding season. The number of labels bearing no sex mark or one that is obviously wrong is almost incredible, and among the gulls where the plumages of the sexes are alike, and females may be recognized only by their smaller size, the question of correct sex marks is of the greatest importance. In the large series examined, I found an unusual proportion of moulting birds that have been of the greatest value in tracing out the sequence of moults and plumages, although less serviceable for measurements of wings and tails.

Relative measurements are shown on the accompanying table which has been prepared by selecting, so far as possible, adult breeding birds and young birds taken so late in the fall and winter that they would be expected to have attained their full growth. It will be observed that except for their bills the young birds closely approximate to adult dimensions, and it is a well-known fact that the tarsi and toes of young gulls very quickly attain their full growth. It is of interest that *leucopterus* averages about 16 % and the bill 33 % smaller than *glaucus*, while *barrovianus* is scarcely 3 % smaller in size and 4 % smaller in bill. Now, the individual variation in any of the species under discussion amounts to more than 7 %, and it is doubtful if any two students measuring the same birds would come within 3 % of the same result. Furthermore, in *barrovianus* the character of bill —"which has the depth through the angle never less and usually decidedly greater

MEASUREMENTS. — *Males.*

		Wing.			Tail.			Tarsus.			Toe with Claw.			Bill, Exposed Culmen.			Bill, Depth at Base.			Bill, Depth at Angle.		
	No. of Specimens.	Aver mm.	Max. mm.	Min. mm.	Aver mm.	Max. mm.	Min. mm.	Aver mm.	Max. mm.	Min. mm.	Aver mm.	Max. mm.	Min. mm.	Aver mm.	Max. mm.	Min. mm.	Aver mm.	Max. mm.	Min. mm.	Aver mm.	Max. mm.	Min. mm
L. glaucus	9 ad.	468	483	457	198	213	190	72	75	70	71	74	69	63	66	60	22	24	21	22	24	21
"	7 juv.	466			187			72			71			60			20			20		
L. barrovianus	5 ad.	458	470	444	189	197	178	71	74	69	69	72	66	61	65	56	21	22	20	21	22	20
"	3 juv.	460			189			71			69			55			19			17		
L. leucopterus	5 ad.	414	420	406	169	178	165	56	58	54	55	58	51	42	43	38	15	17	13	15	17	14
"	9 juv.	415			167			59			57			42			14			14		
L. kumlieni	3 ad.	413	417	409	170	183	170	58	58	57	58	60	57	45	46	43	16	17	15	16	17	15
"	3 juv.	411			171			60			58			46			15			16		
L. nelsoni	2 ad.	441	444	438	224	226	222	75	76	74	72	74	71	58	61	56	21	21	20	22	22	21
"	2 juv.	432			177			74			76			55			18			18		
L. glaucescens	8 ad.	431	444	417	176	180	170	70	72	66	70	74	67	57	65	53	20	21	18	20	22	19
"	3 juv.	422			174			65			67			54			18			18		
										Females.												
L. glaucus	8 ad.	441	451	432	191	206	184	69	73	66	67	72	63	58	61	56	20	21	19	20	21	19
"	4 juv.	446			189			69			67			58			19			19		
L. barrovianus	9 ad.	436	457	425	180	190	171	66	73	62	63	71	58	54	60	51	19	21	17	19	20	18
"	6 juv.	432			173			66			62			51			17			16		
L. leucopterus	4 ad.	400	403	399	161	165	152	56	59	52	53	56	52	41	42	40	14	15	14	15	15	14
"	7 juv.	394			154			57			56			41			14			14		
L. kumlieni	6 ad.	396	400	394	167	178	159	54	56	51	55	57	53	41	43	39	15	15	13	15	16	14
"	1 juv.	381			152			53			53			44			14			14		
L. nelsoni	2 ad.	409	413	406	172	173	171	64	64	63	63	65	60	51	51	52	17	17	16	17	18	16
"	none																					
L. glaucescens	5 ad.	403	419	394	169	178	165	64	68	63	63	67	59	52	55	49	18	20	17	18	20	18
"	3 juv.	397			165			64			62			50			17			17		

than through the base"— on which the species was founded proves to be mythical. It is true that the largest specimens of *barrovianus* never quite reach the dimensions of the largest *glaucus,* but overlapping of size is so considerable, even when careful comparison of sexes is made, that without first reading the labels one cannot, except in a very few cases, tell whether a bird is from Greenland or from Alaska. The variation in the size and shape of the bill in gulls is very great, and a few millimeters difference in wings that are as long as one's arm is hardly ground on which to rest a subspecies, much less a full species. In view, therefore, of these facts, I would urge the removal of *barrovianus* from the North American list, the name becoming a synonym of *glaucus.*

Measurements, while dry, are instructive, although often positively misleading when derived from very small series. My table shows that the individual variation within each species is over 7 %. It also shows that *kumlieni* is the size of *leucopterus* with a bill 6 % larger, and *nelsoni* 16 % larger than *kumlieni* with a bill 24 % larger, a species, in fact, just about the size of *glaucus.*

Before discussing the plumages of the different species it may be well to draw attention to characters that are shared in common. Adults in breeding dress are white birds with white tails and with white tips to the flight-feathers, the gray of the mantles shading into the primaries, which are lighter in *glaucus* and *leucopterus,* darker in *glaucescens,* and have slaty markings in *kumlieni* and *nelsoni;* in winter the white heads and breasts are more or less clouded with smoky gray. The bills at all seasons are bright yellow with a vermilion red spot at the angle of the lower mandible, neither the yellow nor the red losing all its color even in old dried specimens. The legs and feet are flesh colored, drying to various shades of brown and yellow. The eyelids are yellow and the irides a pale yellow. Young birds are in general appearance pale brown and white, or gray, usually with a mottled or 'watered' effect, the primaries brown or gray, often white, and with no mottling or very little of it at the apices. The bills are brownish black paling to buff at the base. The legs and feet are flesh colored. The irides are brown.

I will not attempt to outline here the intermediate stages of plumage through which each species goes. Suffice it to say that

young birds at the limited postjuvenal moult in November or later reassume some mottled feathers, likewise at the prenuptial in March, and even at the first postnuptial in August there are often many evidences of immaturity that persist throughout a second year. The adults undergo a complete postnuptial moult in August or September and a partial prenuptial moult in March or April. The details of plumage and of moult may be better discussed under the separate species, and we may now turn at once to them.

Larus glaucus. GLAUCOUS GULL.

This large circumpolar species breeds within the Arctic circle, moving southward in winter along the shores of both the Atlantic and the Pacific oceans, sometimes nearly half way to the equator. Knowledge of its plumages are derived from the material brought by Arctic expeditions and from winter specimens. I have examined an even 200 of these birds, over 50 of them from Alaska, the home of the so-called '*Larus barrovianus*,' the series also including over a dozen of the pure white phase known as '*Larus hutchinsii*,' probably the '*arcticus*' of earlier writers. The plumages of this species are too well known to require careful description, but the plumage changes in connection with the moults have never been thoroughly described. The sequence is as follows:

Natal Plumage.— The chicks are thickly covered with a soft, dingy white down with large brownish gray spots clouding the upper surface, especially about the head. Hatching in June, before July is spent, they are well advanced into the next plumage, the flight-feathers of which are among the first to appear.

Juvenal Plumage.— August or early September finds birds wholly in the brown barred or mottled plumage, of which the flight-feathers and the tail are retained for a full year, the body plumage and some of the lesser wing-coverts being partially renewed at two periods of moult, the postjuvenal in November or later and the prenuptial beginning often as early as the end of February. Birds may be found moulting at any time between October and May, and it may possibly turn out that but one moult takes place, but as the renewal of feathers is rather limited, and

as fall specimens always reassume brown feathers while late winter birds acquire much paler brown feathers usually mixed with white or gray ones, thus approaching the plumage of the adult, it is but logical to assume that some birds at least undergo a double moult during the first winter of their lives. In juvenal plumage the back and upper surface of the wings is dull white, the individual feathers coarsely barred and mottled with a pale buffy brown or drab-gray, giving a 'watered' effect, as if the color had run. The head, throat and neck are similar but paler, the brown in obscure streaks, and the lower parts are darker gray with indistinct clouding. The tail resembles the back but the mottlings are generally finer. There is considerable variation in the color of the primaries and secondaries of different specimens. They vary from pale ecru-drab, which tinges the yellowish white shafts, to dull white with straw-yellow shafts. There is usually a subapical dash or spot of brown, most conspicuous on the inner and often lacking on the outer primaries, especially if these be white. The first primary is usually palest on the outer web, and nearly all of them become paler toward their tips where occasionally an obscurely indicated white area may be found. The legs, feet and eyelids are flesh colored, becoming brownish ochre in the dried skin. The bill of very young birds is also largely flesh colored, later becoming bluish black at the tip beyond the nostril and drying in skins to a brownish black with the base dull buff-yellow. The iris is brown and, like the bill, remains of the same color for about a year.

First Winter Plumage.— Acquired by a partial postjuvenal moult. As explained earlier, this plumage does not appear to differ from the juvenal which it only partially supplants, chiefly on the back. The overlapping of the postjuvenal and prenuptial moults obscures the question of whether all young birds pass through one or two moults during their first winter, but the evidence is in favor of two. Before the time of the prenuptial arrives birds have faded out a good deal and are often quite white in appearance with the brown mottling very obscure. The paler of the drab primaries apparently fade to white in some cases.

First Nuptial Plumage.— Like many other species of the larger gulls *glaucus* does not breed the first year and most of them remain in a brown plumage not materially different from the juvenal.

Some, however, at the prenuptial moult in March or April acquire to some extent white feathers about the head and body and a few pearl-gray ones on the back, but brown feathers are predominant, rather less distinctly mottled than those which preceded them.

Second Winter Plumage.— There is no dearth of moulting specimens taken during August and early September to show what changes take place at the postnuptial moult, but which birds illustrate the first and which the second (a year later) it is not so easy to determine. If the age of the different specimens could be known the matter would be simple, but it is probable that, as is the case with other species, the great majority of 'immature' plumages result from the first postnuptial moult. In *glaucus* the variety of plumages appears to be considerable. In a very few birds brown mottled feathers still predominate, although birds with fairly developed gray mantles, white tails sprinkled with brown, and having pale ecru-drab or white primaries are perhaps the most usual type of plumage. The white heads and bodies are much obscured with smoky gray. An extreme is represented by birds absolutely pure white, the '*hutchinsii*' type. I was in error some years ago when I conjectured such birds to be old ones, for they are undoubtedly in a second year plumage, and moulting birds examined show the transition into it and also out of it at a later moult. Curiously enough, in some specimens new brown mottled feathers are succeeding to the white ones, both at the prenuptial and at the postnuptial moults, at the latter period pinkish drab primaries replacing snow white ones! Between the two extremes, the brown mottled and the white birds, every sort of variation may be found, and in some of the specimens examined, new brown, new white and new gray feathers (and even a triple mixture in single feathers) may be found growing side by side. It is evident therefore that not only does the vigor of individual birds vary, but the pigmentation of the feather germs of the individual varies to a considerable degree, possibly influenced by cold or food-supply. If white were the regular second year plumage there would be more of such specimens and not so many of tricolor plumage that certainly are suggestive of albinism on a large scale. Such white birds eventually assume normal gray plumage as specimens in moult clearly show. I am of opinion that nearly all of the 'imma-

ture' plumages are the result of the first postnuptial moult. The subapical spotting of the primaries betrays first year birds when it is present, but sometimes it is lacking. In second year birds it is, I believe, always lacking. Another earmark of first year birds is the dark bill. In second year birds it becomes more or less yellow with dusky bluish clouding, and the red spot usually does not develop till the second prenuptial moult has begun. The white birds have dark bills, which would indicate immaturity here as well as in plumage, and it will be noticed that, taken as a whole, the birds having the most yellow in the bill also have the most gray in their plumage, showing that both bill and feathers are equally influenced by whatever factor makes for maturity.

Second Nuptial Plumage.— The second prenuptial moult, at its height in April, is confined to the body feathers and a few of the lesser wing-coverts and scapulars. Gray, white, and brown feathers are regularly found. Some birds, except for wings and tail, are now like adults. The white birds acquire feathers of several colors, less often showing gray ones than do the browner birds.

Third Winter Plumage.— This plumage, acquired by the complete second postnuptial moult, appears to be that of the adult in the majority of cases. An occasional feather faintly sprinkled with brown may be found among the body or the tail feathers, but the adult primaries, pale pearl-gray like the mantle and fading to white a couple of inches from their apices, are now acquired for the first time. In still older adults the transition from gray to white on the primaries becomes more pronounced (as it always is on the secondaries and tertiaries) and the heads and bodies become pure white with scarcely a trace of the dusky clouding of younger birds. But here again the birds of the white type show a curious reversion to the juvenal condition of plumage for, as before stated, I have examined several that are exchanging white primaries for pale drab ones and white body feathers for brown mottled ones. On the other hand I have seen two others that are passing directly from white to gray. All of these specimens have the white wings and tails that are acquired at the first postnuptial moult and must therefore be two years old, for I do not believe a juvenal plumage could ever fade to the whiteness seen in these birds. I am forced to conclude, therefore, that white birds are a

year behind in their development, becoming white at the first postnuptial moult through deficiency of pigment, and assuming only at the second postnuptial a plumage that more vigorous birds acquire at the first postnuptial. From this it is evident that it is possible in a very few cases to confuse third winter with second winter birds, and this species illustrates well the difficulties that beset the study of plumages and moults.

It is further evident that only a small percentage of birds of this species fail to acquire adult plumage by their third winter while a good many of them possess the adult mantle and white body feathers of the adult during their second winter, off-color wings and tails alone marking them. It is impossible to estimate with any degree of accuracy what proportion of young birds at each successive moult pass to a more adult stage of plumage and what proportion reassume the feathers of adolescence, but it would seem that the time usually assigned for the attainment of adult plumage is exaggerated. Apparently, females are more backward in assuming mature feathers than are the males.

The sequence of plumages and moults here outlined obtains for all the species under consideration. There is reason, however, for believing that in the smaller species a larger proportion of the birds at the successive moults assume feathers characteristic of the adult than is the case in the larger species.

Larus leucopterus. WHITE-WINGED OR ICELAND GULL.

This species is perhaps even more Arctic in distribution than *glaucus*, its breeding range extending from Spitzbergen westward to Greenland and the shores of Baffin's Bay. Thus it is associated throughout its range with *glaucus*, although seldom moving as far south in winter. Some sixty specimens have passed through my hands, and the sequence of moults and plumages is precisely the same as in the larger *glaucus* of which it is a small edition. There is, however, no overlapping of dimensions, for even the largest male fails to reach the size of the smallest female *glaucus*.

Specimens of adults are rare in collections, for I have found only fourteen in all. Young birds in juvenal plumage do not

differ from *glaucus*, as a rule, although the primaries more frequently have white or brownish shafts untinged with the yellow so prominent in *glaucus*. Some birds, too, are in the mottling perhaps more black and white rather than brownish. Second year birds more often have adult mantles than do second year *glaucus*, but the creamy or pinkish drab, or white primaries and brown mottled feathers in wings or tail betray their age. The white phase is also illustrated by two specimens, one in the collection of Mr. Everett Smith which is white except for a few pearl-gray feathers on the back, very pale drab primaries, and a few obscure mottlings on otherwise white feathers, and one in the American Museum which is pure white except for a small area of gray on the back. These are doubtless birds that have passed through the first postnuptial moult like '*hutchinsii*,' and the partly yellow bills support this assumption. They are probably the '*candidus*' and '*glacialis*' of early writers.

It should also be noted that in adults the mantle is rather darker than that of *glaucus*, although the color of each species varies somewhat in shade. In both of these gulls the gray is subject to considerable fading, and the transition from gray to white a couple of inches or so from the tips of the primaries is never abrupt.

Larus glaucescens. GLAUCOUS-WINGED GULL.

While this medium-sized gull is not properly white-winged, I introduce it here for purposes of comparison. Its range is along the western coast of North America from the United States northward. In size it is a little larger than *leucopterus* with a much larger bill; in all plumages it differs radically from *glaucus* and *leucopterus*.

The *juvenal plumage* is deep plumbeous gray with broad dark barring or mottling and obscure whitish edgings. The tail is nearly solidly gray sprinkled basally with white, and the flight-feathers, including the quills, are also dark gray. The legs and feet are flesh-colored and the bill brownish black. Birds in this plumage are never so pale (especially the primaries) as the darkest *leucopterus*, nor are they ever so dark as the palest of the black-pri-

maried species. They fade to a decidedly brown shade, almost mouse gray, but their color (especially that of the primaries) and the size of their bills even when young are cardinal points by which to recognize them.

The *first winter plumage* is like the juvenal, but at the prenuptial moult white about the head and body and gray on the back begins to appear in some specimens, thus marking the *first nuptial plumage.*

In the *second winter plumage* unpatterned drab or mouse-gray primaries are most frequent, together with the gray mantle of the adult. The white head and neck, as in the other species, are much clouded with dusky markings, which are lost at the next prenuptial moult. I do not think that primaries with the apical white spots of the adult bird are ever developed until a year later, but in some birds there is a foreshadowing of the white spot on the first primary. The *third winter plumage,* that of the adult, is the result of the second postnuptial moult, after which very few birds can be found showing traces of immaturity. The new primaries are slaty, and white-tipped, the first and sometimes the second with subapical or sometimes terminal white 'mirrors,' quite unlike the unpatterned feathers of *glaucus* or the smaller *leucopterus.* The mantle varies from cinereous to plumbeous gray, the color running over into the primaries, which become decidedly slaty towards their apices. The white of the head and neck is still clouded, the dusky markings being characteristic of winter plumages until the birds are quite advanced in age. At prenuptial moults, as in the other species, these feathers are replaced by white ones.

Larus kumlieni. KUMLIEN'S GULL.

Since this species was described in 1883 by Mr. Wm. Brewster nothing has been added to our knowledge of it save the recording of additional specimens. I have examined twenty-two of these birds, about a dozen in adult plumage, several in intermediate immature stages, and four in a plumage that I am convinced is the undescribed plumage of the young bird. This material shows

that adult *kumlieni* is possessed of a character (the dusky subapical banding of the primaries) that neither *leucopterus* nor *glaucescens* have at any stage of plumage and therefore its right to rank as a species seems unimpeachable. The type locality is Cumberland Sound, where it breeds, and winter specimens have been taken chiefly along the Atlantic coast of Canada and the United States as far south as New York.

The plumages when taken up in their proper sequence are as follows:

The *natal down* is unknown as no chicks have as yet found their way into collections.

Juvenal Plumage.— Mr. L. Kumlien, who secured the type of the species at Cumberland Sound, mistook all the birds he saw for *glaucescens*, and speaks of the young as "even darker than the young of *L. argentatus*, the primaries and tail being *very nearly black*." This is not an accurate statement for although the birds are as dark as *glaucescens* in like plumage, they are not as dark as *argentatus*. The juvenal plumage may be described as follows:

Above, drab-gray mottled with dull white and obscurely barred and mottled with darker gray; below more solidly gray, paler about the head and throat. Flight-feathers a brownish gray, darker than the body, the outer webs of the primaries darkest. Tail almost solidly drab-gray, the basal portion and the outer pair of rectrices sprinkled with dull white; the upper and under tail-coverts, similar in color but with a good deal of blotching or barring. Bill "dusky," paling to buffy flesh-color at base. Legs and feet "flesh" (in dried specimen dull ochre). Iris "gray."

This description would fit any one of three birds, a male in the collection of Dr. Wm. C. Braislin, taken at Rockaway, New York, March 9, 1898, a female in the collection of Mr. Louis H. Porter, taken at Stamford, Conn., Feb. 16, 1894, and an unsexed (undoubtedly male) bird in my own collection obtained near Tadousac, Quebec, by an Indian during the winter of 1900–01, probably towards spring. They might easily pass for specimens of *glaucescens*, if it were not for the small bills and rather smaller dimensions. They are considerably darker (especially the primaries) than the darkest *leucopterus* I have seen, and the nearly solid gray of the

tail is a feature not seen in *leucopterus*. Besides this, the barring and mottling is much coarser and darker. In one of the birds there is a faintly indicated whitish subapical spot on the first primary, but similar spots may be found in other species of gulls and it seems to be a variable character of little importance. These specimens are perhaps not in full juvenal plumage, for they are probably partly in first winter dress, and two of them, just beginning the prenuptial moult, have acquired a few gray nuptial feathers of the mantle, but it must be remembered that the differences between juvenal and first winter plumages of the gulls are inappreciable. It is probable that the brown shade is due to fading and that earlier in the season these birds were grayer. They also bear quite a close resemblance to *L. californicus* in similar dress, but in this species the primaries are usually very much darker. In the young bird figured, Plate I (Collection of J. D., Jr., No. 7711, Tadousac, Que.) the wings, tail and part of the body plumage are juvenal, while some of the body feathers are doubtless the brown first winter with a sprinkling of the new first nuptial dress.

First Winter Plumage.— From what has just been said it has been made evident that this plumage differs in practically no respect from the juvenal. The postjuvenal moult is variable in the time of its occurrence, just as it is in all the gulls, and overlaps the prenuptial so as to be in many cases confused with it.

First Nuptial Plumage.— This plumage doubtless closely resembles the juvenal or the first winter, but birds may be expected to become whiter about the head and with a few gray feathers on the back.

Second Winter Plumage.— Like *leucopterus*, this species attains a considerable amount of adult plumage at this moult. The gray mantle, clouded white head and body and white tail indicate a close approximation to the adult plumage, but the primaries and other feathers of the wings are usually drab and not very much paler than in first winter birds. Dark gray or mottled feathers may also be found on the wings or tail or on the body posteriorly. The bills are yellow but often clouded and with the red spot lacking. The variation is considerable, just as in *glaucus* or *leucopterus* or *glaucescens*, but the darkness of flight-feathers or tail or of both combined is a character useful in sepa-

rating *kumlieni* from the two species last mentioned. The tail feathers, like those of *glaucescens*, while largely white may show gray patches, chiefly on the inner webs.

Second Nuptial Plumage.— The body plumage is renewed more or less at the second prenuptial moult, and I find evidence of this in several specimens, notably one in the collection of Mr. Wm. Brewster (No. 10052, Nova Scotia, March 8). Another bird in my own collection (No. 11577, Sable Island, Nova Scotia, March 19, 1903) is also moulting and is of particular interest because it is in a body plumage largely white, like the phase seen in both *glaucus* and *leucopterus*. The primaries of this bird are, however, quite dark brown, and there are other evidences of a faded brown mottled dress, so that it is probably a bird passing through the first prenuptial moult.

Third Winter Plumage.— Just as in the other gulls, this species after the second postnuptial moult assumes (except perhaps in a very few cases) the adult plumage, which is figured for the first time on the accompanying Plate I, by Mr. L. A. Fuertes, from an adult female in my collection (No. 9039, Sable Island, Nova Scotia, March 29, 1902). The text figure (Fig. 1) shows how this bird, *C*, differs in the pattern of the primaries from the type, *A* (U. S. Nat. Mus. No. 76225, Cumberland Sound, June 14, 1878), and I have also shown further variation in *B* (Coll. of E. Smith, No. 13631, Feb., Bay of Fundy) and in *D* (Coll. of E. A. & O. Bangs, No. 10709, ♀, Newfoundland, March 26). Mr. Brewster has so accurately described the type (Bull. N. O. C., VIII, 1883, p. 216) that no further description is necessary. We have in *kumlieni* a bird practically the size and color of *leucopterus*, but with slaty or brownish subterminal bars and shadings on several of the primaries, markings that neither *leucopterus* nor *glaucescens* ever have. The nearest approach to the former species may be found in a specimen (U. S. Nat. Mus. No. 161845, ♀, Baffinland, August) that lacks the bars but shows another distinctive character, to wit, a slaty outer web of the first primary to within a couple of inches of its apex. Dark markings also appear on the outer webs of the second and third primaries in this specimen. Adults therefore appear to vary from birds with bands on the second, third and fourth primaries to those in which the bands are more

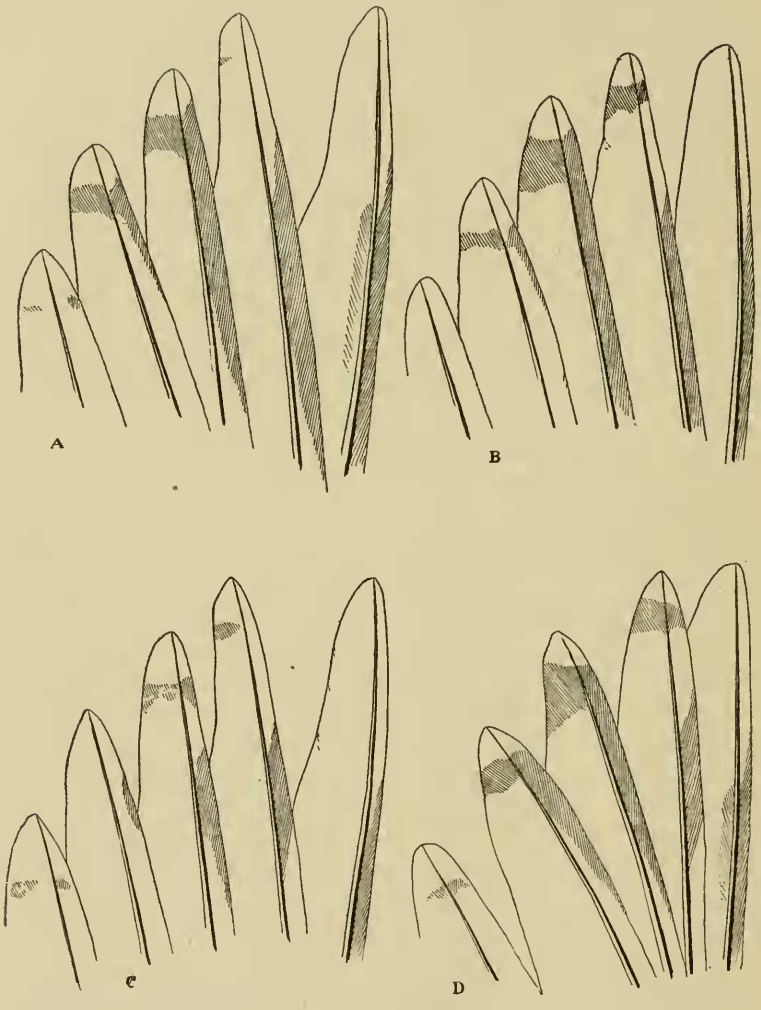

FIG. 1. VARIATIONS IN THE WING-PATTERN OF *Larus kumlieni.*

or less eliminated, but the slaty or brown edgings of the first and other primaries are always present.

Mr. Brewster has been in doubt whether the name *chalcopterus* might not be available for this species. The supposed type of Lichtenstein's bird is in the Berlin Museum where, through the courtesy of Dr. Anton Reichenow, I was permitted to examine it only last summer. It is No. 13583, a bird in juvenal or first winter plumage, darker than *glaucescens* ever is, and the primaries so nearly black that it is evidently the young of some species that has black primaries with white spots when adult,— possibly *L. californicus*. The dimensions best fit this species although the locality given is "Polar-meer," but at all events it is neither *leucopterus* nor *glaucescens*. Nor does Bruch's description of *chalcopterus* fit *kumlieni*, for the primaries do not have "round white terminal spots." Therefore Mr. Brewster was justified in giving a new name to a new species so rare that in twenty-two years only a like number of specimens have found their way into collections.

It is rather odd that *Larus leucopterus* in adult plumage from the Atlantic coast is almost unknown, the young birds being rather common, while in the same region adult *kumlieni* has been repeatedly captured and the young rarely. There is no doubt that both species will be found to be more abundant when they are diligently looked for. My specimen from Tadousac, Que., is I believe the first record of *kumlieni* for Quebec, and Mr. L. H. Porter's the first for Connecticut. There is also an unrecorded specimen, a young female taken at Plymouth, Mass., Jan. 5, 1888, in the museum at Tring, but with these exceptions most of the specimens are already on record. It may be well to note here that the type, at one time mounted and exposed to the light, has faded many shades lighter than are fresh birds.

Larus nelsoni. NELSON'S GULL.

In 1884, Mr. H. W. Henshaw ventured to describe this species on the strength of a single breeding male from Alaska (U. S. Nat. Mus. No. 97253, ♂ St. Michaels, Alaska, June 20, 1880). Since then a specimen from Bering Straits has turned up in the

British Museum, another male from St. Michaels in the Acad. Nat. Sci. of Philadelphia (No. 37692, St. Michaels, Alaska, ♂ Sept. 5, 1897) and recently a fourth (Mus. Carnegie Inst. No. 7729, ♀, San Geronimo I., Lower California, March 18, 1897) which is apparently a nearly adult female has been taken at a surprisingly southern locality. I have examined all of these four birds and find that the type, the specimen in the British Museum, and the bird in the Philadelphia Academy are very similar, and the pattern of the primaries corresponds very nearly to the type specimen of *kumlieni*, the outer webs being slaty or brownish but the terminal bands much less distinct. The Carnegie specimen, on the other hand, is nearly the counterpart of the U. S. Nat. Mus. specimen of *kumlieni* (No. 161845) described above; there is no banding, but merely dusky outer webs of the primaries. Doubtless in time other specimens will be obtained, but judging from the few extant, *nelsoni* seems to have as good a claim for specific distinctness as does *kumlieni*, of which it appears to be a large edition. It is a species about the size of *glaucus* and as much larger than *kumlieni*, 16 %, as *glaucus* is larger than *leucopterus*. The bill, however, seems to be only about 24 % larger, but with tarsi and toes relatively very large.

The young bird has never been described, but inasmuch as *kumlieni* in juvenal plumage is scarcely to be distinguished from *glaucescens*, there is every reason for expecting the corresponding plumage of *nelsoni* to be practically the same. The birds, though, ought to be larger than *glaucescens* and I have no doubt that very large specimens now labelled '*glaucescens*' in various collections will eventually prove to be *nelsoni*. Such a bird has been recorded in the British Museum Catalogue, but somehow I overlooked it when examining the collection. In the American Museum, however, I find two specimens (Nos. 26234 and 61536) so much larger than *glaucescens* usually is that I believe them to be *nelsoni*. The tarsi and feet are unusually large and massive and the bills very heavy. The bird in the Philadelphia Academy is completing an adult postnuptial moult, but the other specimens throw very little light on the subject of moult in this species.

While I may not have been entirely successful in untangling the confusing multitude of so-called immature plumages in these spe-

cies, I have at least shown the way to complete success. To call a plumage merely "immature" is to confess we do not know much about it. Each of the species under consideration has no less than five plumages that may be called "immature," the juvenal, the first winter, the first nuptial, the second winter and the second nuptial, and in a few exceptional cases we may add the third winter and the third nuptial, making seven. Even the large amount of material I have examined does not make every one of these plumages perfectly clear, but it is only by the comparison of comparable plumages that we shall ever arrive at the desired goal. There is a large portion of Arctic America still unexplored, and with other material it may some day be necessary to revise in part my present conclusions.

My work has been prosecuted at intervals during several years but I trust it has lost nothing by being so long delayed.

I am indebted to many institutions and individuals for courtesies and for the loan of specimens, particularly to Dr. Sharpe and Mr. Grant of the British Museum; to Mr. Hartert of the Rothschild Museum at Tring; to Dr. Reichenow of the Berlin museum; to Mr. Ridgway and Dr. Richmond of the U. S. Nat. Museum; Mr. Nelson of the Biological Survey; to Dr. Allen and Mr. Chapman of the American Museum of Natural History; to Mr. Stone of the Philadelphia Academy of Natural Sciences; and to the following private collectors, viz. Mr. O. Bangs, Mr. C. F. Batchelder, Dr. L. B. Bishop, Mr. Wm. Brewster, Dr. Wm. C. Braislin, Mr. R. W. Peavey, Mr. L. H. Porter, and Mr. Everett Smith.